General

Guideline Title

Clinical practice guidelines for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient - 2013 update: cosponsored by American Association of Clinical Endocrinologists, The Obesity Society, and American Society for Metabolic and Bariatric Surgery.

Bibliographic Source(s)

Mechanick JI, Youdim A, Jones DB, Garvey WT, Hurley DL, McMahon MM, Heinberg LJ, Kushner R, Adams TD, Shikora S, Dixon JB, Brethauer S, American Association of Clinical Endocrinologists, Obesity Society, American Society for Metabolic & Bariatric Surgery. Clinical practice guidelines for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient--2013 update: cosponsored by American Association of Clinical Endocrinologists, the Obesity Society, and American Society for Metabolic & Bariatric Surgery. Endocr Pract. 2013 Mar-Apr;19(2):337-72. [403 references] PubMed

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Mechanick JI, Kushner RF, Sugerman HJ, Gonzalez-Campoy JM, Collazo-Clavell ML, Guven S, Spitz AF, Apovian CM, Livingston EH, Brolin R, Sarwer DB, Anderson WA, Dixon J. American Association of Clinical Endocrinologists, the Obesity Society, and American Society for Metabolic and Bariatric Surgery Medical guidelines for clinical practice for the perioperative nutritional, metabolic, and nonsurgical support [trunc]. Endocr Pract. 2008 Jul-Aug;14(Suppl 1):1-83.

Regulatory Alert

FDA Warning/Regulatory Alert

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- April 8, 2016 – Metformin-containing Drugs : The U.S. Food and Drug Administration (FDA) is requiring labeling changes regarding the recommendations for metformin-containing medicines for diabetes to expand metformin's use in certain patients with reduced kidney function. The current labeling strongly recommends against use of metformin in some patients whose kidneys do not work normally. FDA concluded, from the review of studies published in the medical literature, that metformin can be used safely in patients with mild impairment in kidney function and in some patients with moderate impairment in kidney function.

Recommendations

Major Recommendations

The levels of evidence (1–4) and the recommendation grades (A–D) are defined at the end of the "Major Recommendations" field.

Questions and Guideline Recommendations

The recommendations are evidence-based (Grades A, B, and C) or based on expert opinion because of a lack of conclusive clinical evidence (Grade D). The "best evidence" rating level (BEL), which corresponds to the best conclusive evidence found, accompanies the recommendation grade.

The Executive Summary is reorganized by clinical questions and provides updated recommendation numbers (R1, R2, R3, … R100) with original recommendation numbers in parentheses, and an appended "-r," indicating substantive content or grading revision, or "-NEW," indicating new content.

Which Patients Should Be Offered Bariatric Surgery?

R1(1)-r. Patients with a body mass index (BMI) ≥40 kg/m^2 without coexisting medical problems and for whom bariatric surgery would not be associated with excessive risk should be eligible for 1 of the procedures (Grade A; BEL 1).

R2(2/3)-r. Patients with a BMI ≥35 kg/m^2 and 1 or more severe obesity-related co-morbidities, including type 2 diabetes mellitus (T2D), hypertension, hyperlipidemia, obstructive sleep apnea (OSA), obesity-hypoventilation syndrome (OHS), Pickwickian syndrome (a combination of OSA and OHS), nonalcoholic fatty liver disease (NAFLD) or nonalcoholic steatohepatitis (NASH), pseudotumor cerebri, gastroesophageal reflux disease (GERD), asthma, venous stasis disease, severe urinary incontinence, debilitating arthritis, or considerably impaired quality of life, may also be offered a bariatric procedure. Patients with BMI of 30 kg/m^2 to 34.9 kg/m^2 with diabetes or metabolic syndrome may also be offered a bariatric procedure, although current evidence is limited by the number of subjects studied and lack of long term data demonstrating net benefit.

- Grade A, BEL 1 for BMI ≥35 kg/m^2 and therapeutic target of weight control and improved biochemical markers of cardiovascular disease (CVD) risk
- Grade B, BEL 2 for BMI ≥30 kg/m^2 and therapeutic target of weight control and improved biochemical markers of CVD risk
- Grade C, BEL 3 for BMI ≥30 kg/m^2 and therapeutic target of glycemic control in T2D and improved biochemical markers of CVD risk

R3(4)-r. There is insufficient evidence for recommending a bariatric surgical procedure specifically for glycemic control alone, lipid lowering alone, or cardiovascular disease risk reduction alone, independent of BMI criteria (Grade D).

Which Bariatric Surgical Procedure Should Be Offered?

R4(5/6/7)-r. The best choice for any bariatric procedure (type of procedure and type of approach) depends on the individualized goals of therapy (e.g., weight loss and/or metabolic [glycemic] control), available local-regional expertise (surgeon and institution), patient preferences, and personalized risk stratification (Grade D). At this time, there is still insufficient evidence to generalize in favor of one bariatric surgical procedure for the severely obese population (Grade D). In general, laparoscopic bariatric procedures are preferred over open bariatric procedures due to lower early postoperative morbidity and mortality (Grade B; BEL 2). Laparoscopic adjustable gastric banding (LAGB), laparoscopic sleeve gastrectomy (LSG), laparoscopic Roux-en-Y gastric bypass (RYGB), and laparoscopic biliopancreatic diversion (BPD), BPD/duodenal switch (BPD-DS), or related procedures are primary bariatric and metabolic procedures that may be performed in patients requiring weight loss and/or metabolic control (Grade A; BEL 1). Physicians should exercise caution when recommending BPD, BPD-DS, or related procedures because of the greater associated nutritional risks related to the increased length of bypassed small intestine (Grade A; BEL 1). Investigational procedures may be considered for selected patients based on available institutional review board (IRB) approved protocols, suitability for clinical targets and individual patient factors, and only after a careful assessment balancing the importance for innovation, patient safety, and demonstrated effectiveness (Grade D).

How Should Potential Candidates for Bariatric Surgery Be Managed Preoperatively?

R5(8). All patients should undergo preoperative evaluation for obesity-related co-morbidities and causes of obesity, with special attention directed to those factors that could affect a recommendation for bariatric surgery (see the preoperative checklist for bariatric surgery in Table 5 in the original guideline document) (Grade A; BEL 1).

R6(9). The preoperative evaluation must include a comprehensive medical history, psychosocial history, physical examination, and appropriate laboratory testing to assess surgical risk (see Table 5 in the original guideline document) (Grade A; BEL 1).

R7(10). The medical necessity for bariatric surgery should be documented (Grade D).

R8(11/12)-r. Because informed consent is a dynamic process, there should be a thorough discussion with the patient regarding the risks and benefits, procedural options, choices of surgeon and medical institution, and the need for long-term follow-up and vitamin supplementation (including costs required to maintain appropriate follow-up) (Grade D). Patients should also be provided with educational materials and access to preoperative educational sessions at prospective bariatric surgery centers (Grade D). Consent should include experience of the surgeon with the specific procedure offered and whether the hospital has an accredited bariatric surgery program (Grade D).

R9(13)-r. Financial information should be provided, and the bariatric surgery program should be able to provide all necessary clinical material for documentation so that third-party payor criteria for reimbursement are met (Grade D).

R10(14)-r. Preoperative weight loss can reduce liver volume and may help improve the technical aspects of surgery in patients with an enlarged liver or fatty liver disease and is therefore encouraged before bariatric surgery (Grade B; BEL 1; downgraded due to inconsistent results). Preoperative weight loss or medical nutritional therapy may also be used in selected cases to improve co-morbidities, such as reasonable preoperative glycemic targets (Grade D).

What Are the Elements of Medical Clearance for Bariatric Surgery?

R11(15-17)-r. Preoperative glycemic control should be optimized using a diabetes comprehensive care plan, including healthy dietary patterns, medical nutrition therapy, physical activity, and as needed, pharmacotherapy (Grade A; BEL 1). Reasonable targets for preoperative glycemic control, which may be associated with improved bariatric surgery outcomes, include a hemoglobin A_{1c} value of 6.5% to 7.0% or less, a fasting blood glucose level of ≤110 mg/dL, and a 2-hour postprandial blood glucose concentration of ≤140 mg/dL (Grade A; BEL 1). More liberal preoperative targets, such as an A_{1c} of 7% to 8%, should be considered in patients with advanced microvascular or macrovascular complications, extensive co-morbid conditions, or long-standing diabetes in which the general goal has been difficult to attain despite intensive efforts (Grade A; BEL 1). In patients with A_{1c} >8% or otherwise uncontrolled diabetes, clinical judgment determines the need for bariatric surgery (Grade D).

R12(18/19)-r. Routine screening for primary hypothyroidism before bariatric surgery is not recommended (Grade D). Patients at risk for primary hypothyroidism should have screening serum thyroid-stimulating hormone (TSH) level (Grade B; BEL 2). Patients found to be hypothyroid should be treated with L-thyroxine monotherapy (Grade A; BEL 1).

R13(20/21)-r. A fasting lipid panel should be obtained in all patients with obesity (Grade A; BEL 1). Treatment should be initiated according to the National Cholesterol Education Program Adult Treatment Panel III guidelines. (See also the NGC summary American Association of Clinical Endocrinologists' guidelines for management of dyslipidemia and prevention of atherosclerosis). (Grade D).

R14(22-24)-r. Candidates for bariatric surgery should avoid pregnancy preoperatively and for 12 to 18 months postoperatively (Grade D). Women who become pregnant after bariatric surgery should be counseled and monitored for appropriate weight gain, nutritional supplementation, and for fetal health (Grade C; BEL 3). All women of reproductive age should be counseled on contraceptive choices following bariatric surgery (Grade D). Patients with RYGB or malabsorptive procedures should be counseled in nonoral contraceptive therapies (Grade D). Patients who do become pregnant following bariatric surgery should have nutritional surveillance and laboratory screening for deficiency every trimester, including iron, folate and B_{12}, calcium, and fat soluble vitamins (Grade D). Patients who become pregnant post-LAGB should have band adjustments as necessary for appropriate weight gain for fetal health (Grade B; BEL 2).

R15(25). Estrogen therapy should be discontinued before bariatric surgery (1 cycle of oral contraceptives in premenopausal women; 3 weeks of hormone replacement therapy in postmenopausal women) to reduce the risks for postoperative thromboembolic phenomena (Grade D).

R16(26). Women with polycystic ovary syndrome (PCOS) should be advised that their fertility status might be improved postoperatively (Grade D).

R17(28). Case-by-case decisions to screen for rare causes of obesity should be based on specific historical and physical findings (Grade D).

R18(29-31). Noninvasive cardiac testing beyond an electrocardiogram is determined on the basis of the individual risk factors and findings on history and physical examination (Grade B). Patients with known heart disease may require a formal cardiology consultation before bariatric surgery (Grade D). Patients at risk for heart disease should undergo evaluation for perioperative b-adrenergic blockade (Grade A; BEL 1).

R19(32/33)-r. In patients considered for bariatric surgery, chest radiograph and standardized screening for OSA (with confirmatory

polysomnography if screening tests are positive) should be considered. (Grade C, BEL 3). Patients with intrinsic lung disease or disordered sleep patterns should have a formal pulmonary evaluation, including arterial blood gas measurement, when knowledge of the results would alter patient care (Grade C; BEL 3).

R20(34/157)-r. Tobacco use should be avoided at all times by all patients. In particular, patients who smoke cigarettes should stop, preferably at least 6 weeks before bariatric surgery (Grade A; BEL 2, upgraded by consensus). Also, tobacco use should be avoided after bariatric surgery given the increased risk for of poor wound healing, anastomotic ulcer, and overall impaired health (Grade A; BEL 1).

R21(35/36)-r. Patients with a history of deep venous thrombosis (DVT) or cor pulmonale should undergo an appropriate diagnostic evaluation for DVT (Grade D). A prophylactic vena caval filter may present a greater risk than benefit in patients with a history of prior pulmonary embolism (PE) or DVT given the risks of filter-related complications including thrombosis (Grade C; BEL 3).

R22(37). Clinically significant gastrointestinal symptoms should be evaluated before bariatric surgery with imaging studies, upper gastrointestinal (UGI) series, or endoscopy (Grade D).

R23(38)-r. Abdominal ultrasound is not recommended as a routine screen for liver disease (Grade C, BEL 3). Abdominal ultrasound is indicated to evaluate symptomatic biliary disease and elevated liver function tests. In patients with increased liver function tests (2 to 3 times the upper limit of normal), abdominal ultrasonography and a viral hepatitis screen may be considered (Grade D). Consideration can be made for liver biopsy at the time of surgery to document steatohepatitis and/or cirrhosis that may otherwise be unknown due to normal appearance and/ or liver function tests (Grade D).

R24(39)-r. Routine screening for the presence of *Helicobacter pylori* (H pylori) before bariatric surgery may be considered in high-prevalence areas (Grade C; BEL 3).

R25(40)-r. Before bariatric surgery, prophylactic treatment for gouty attacks should be considered in patients with a history of gout (Grade C, BEL 3).

R26(41). There are insufficient data to warrant preoperative assessment of bone mineral density with dual-energy x-ray absorptiometry (DXA) outside formal clinical practice guideline (CPG) recommendations by the National Osteoporosis Foundation (Grade D).

R27(42/43)-r. A psychosocial-behavioral evaluation, which assesses environmental, familial, and behavioral factors, should be required for all patients before bariatric surgery (Grade C; BEL 3). Any patient considered for bariatric surgery with a known or suspected psychiatric illness, or substance abuse, or dependence, should undergo a formal mental health evaluation before performance of the surgical procedure (Grade C; BEL 3). Following RYGB, high-risk groups should eliminate alcohol consumption due to impaired alcohol metabolism and risk of alcohol use disorder postoperatively (Grade C; BEL 3).

R28(44)-r. All patients should undergo evaluation of their ability to incorporate nutritional and behavioral changes before and after bariatric surgery (Grade C; BEL 3).

R29(45)-r. All patients should undergo an appropriate nutritional evaluation, including micronutrient measurements, before any bariatric surgical procedure. In comparison with purely restrictive procedures, more extensive perioperative nutritional evaluations are required for malabsorptive procedures (Grade A; BEL 1).

R30(NEW). Patients should be followed by their primary care physician and have age and risk appropriate cancer screening before surgery. (Grade C; BEL 3).

How Can Early Postoperative Care Be Optimized?

R31(46-53/90/91)-r. A low-sugar clear liquid meal program can usually be initiated within 24 hours after any of the bariatric procedures, but this diet and meal progression should be discussed with the surgeon and guided by the registered dietician (RD) (Grade C; BEL 3). A consultation for postoperative meal initiation and progression should be arranged with a dietician who is knowledgeable of the postoperative bariatric diet (Grade A, BEL 1). Patients should receive education in a protocol-derived staged meal progression based on their surgical procedure (Grade D). Patients should be counseled to eat 3 small meals during the day and chew small bites of food thoroughly before swallowing (Grade D). Patients should adhere with principles of healthy eating, including at least 5 daily servings of fresh fruits and vegetables (Grade D). Protein intake should be individualized, assessed, and guided by an RD, in reference to gender, age, and weight (Grade D). A minimal protein intake of 60 g/d and up to 1.5 g/kg ideal body weight per day should be adequate; higher amounts of protein intake—up to 2.1 g/kg ideal body weight per day—need to be assessed on an individualized basis (Grade D). Concentrated sweets should be eliminated from the diet after RYGB to minimize symptoms of the dumping syndrome, as well as after any bariatric procedure to reduce caloric intake (Grade D). Crushed or liquid rapid-release medications should be used instead of extended-release medications to maximize absorption in the immediate postoperative period (Grade D).

R32(54/89/93)-r. After consideration of risks and benefits, patients with, or at risk for, demonstrable micronutrient insufficiencies or deficiencies should be treated with the respective micronutrient (Grade A, BEL 2, upgraded by consensus). Minimal daily nutritional supplementation for patients with RYGB and LSG all in chewable form initially (i.e., 3 to 6 months), should include 2 adult multivitamin plus mineral (each containing iron, folic acid, and thiamine) supplements (Grade B, BEL 2), 1200 mg to 1500 mg of elemental calcium (in diet and as citrated supplement in divided doses) (Grade B, BEL 2), at least 3000 international units of vitamin D (titrated to therapeutic 25-hydroxyvitamin D levels >30 ng/ml) (Grade A, BEL 1), and vitamin B_{12} (parenterally as sublingual, subcutaneous, or intramuscular preparations, or orally, if determined to be adequately absorbed) as needed to maintain B_{12} levels in the normal range (Grade B; BEL 2). Total iron provided should be 45 mg to 60 mg via multivitamins and additional supplements. Minimal daily nutritional supplementation for patients with LAGB should include 1 adult multivitamin plus mineral (including iron, folic acid, and thiamine) (Grade B, BEL 2), 1200 mg to 1500 mg of elemental calcium (in diet and as citrated supplement in divided doses) (Grade B, BEL 2), at least 3000 international units of vitamin D (titrated to therapeutic 25-dihydroxyvitamin D levels). Alternatively, in lieu of routine screening with relatively costly biochemical testing, the above routine micronutrient supplementation may be initiated preoperatively (Grade D).

R33(55)-r. Fluids should be consumed slowly, preferably at least 30 minutes after meals to prevent gastrointestinal symptoms, and in sufficient amounts to maintain adequate hydration (more than 1.5 liters daily) (Grade D).

R34(56/92)-r. Nutrition support (enteral nutrition [EN; tube feeds] or parenteral nutrition [PN]) should be considered in bariatric surgery patients at high nutritional risk (e.g., Nutrition Risk Score [NRS 2002] ≥3); PN should be considered in those patients who are unable to meet their needs using their gastrointestinal tract for at least 5 to 7 days with noncritical illness or 3 to 7 days with critical illness (Grade D). In patients with severe protein malnutrition and/or hypoalbuminemia, not responsive to oral or EN protein supplementation, PN should be considered (Grade D).

R35(57)-r. In patients with T2D, periodic fasting blood glucose concentrations should be determined (Grade A; BEL 1). Preprandial, 2-hour postprandial, and bedtime reflectance meter glucose (RMG; "fingerstick") determinations in the home setting should also be encouraged, depending on the patient's ability to test, the level of glycemic control targeted, use of oral agents or insulin, and overall care plan (Grade A; BEL 1). RMG determinations should also be performed if symptoms of hypoglycemia occur (Grade A; BEL 1).

R36(58-61)-r. In patients with diabetes, the use of all insulin secretagogues (sulfonylureas and meglitinides) should be discontinued and insulin doses should be adjusted postoperatively (due to low calorie intake) to minimize the risk for hypoglycemia (Grade D). Antidiabetic medications should be withheld if the T2D is in remission following bariatric surgery (Grade D). Metformin may be continued postoperatively until prolonged clinical resolution of diabetes is demonstrated by normalized glycemic targets (including fasting and postprandial blood glucose and HbA_{1c}). Insulin therapy, using a rapid-acting insulin analogue (insulin lispro, aspart, or glulisine) before meals and a basal long-acting insulin analogue (insulin glargine or detemir) should be used to attain glycemic targets (140 mg/dL to 180 mg/dL) in nonintensive care unit hospitalized patients (Grade D). In the intensive care unit, intravenous regular insulin, as part of a standard intensive insulin therapy protocol, should be used to control hyperglycemia to a 140 mg/dL to 180 mg/dL blood glucose target (Grade D). Antidiabetic medications that improve insulin sensitivity (metformin), as well as incretin-based therapies, should be considered in outpatients not reaching glycemic targets. (Grade D). Endocrinology consultation should be considered for patients with uncontrolled hyperglycemia (Grade D).

R37(62)-r. Patients with high perioperative risk for myocardial infarction should be managed in a monitored telemetry setting for at least the first 24 hours postoperatively (Grade D).

R38(64)-r. Pulmonary management includes aggressive pulmonary toilet and incentive spirometry, oxygen supplementation to avoid hypoxemia, and early institution of continuous positive airway pressure (CPAP) when clinically indicated (Grade C, BEL 3).

R39(65/66)-r. Prophylaxis against deep venous thrombosis (DVT) is recommended for all patients (Grade B; BEL 2). Prophylactic regimens after bariatric surgery include sequential compression devices (Grade C; BEL 3), as well as subcutaneously administered unfractionated heparin or low-molecular-weight heparin given within 24 hours after bariatric surgery (Grade B; BEL 2). Extended chemoprophylaxis after hospital discharge should be considered for high-risk patients, such as those with history of DVT (Grade C, BEL 3). Early ambulation is encouraged (Grade C; BEL 3).

R40(67-71)-r. Respiratory distress or failure to wean from ventilatory support should raise suspicion and prompt an evaluation for an acute postoperative complication, such as pulmonary embolus (PE) or anastomotic leak (Grade D). In the clinically stable patient, UGI studies (water-soluble contrast followed by thin barium) or computed tomography (CT) may be considered to evaluate for anastomotic leaks in suspected patients (Grade C; BEL 3). Exploratory laparotomy or laparoscopy is justified in the setting of high clinical suspicion for anastomotic leaks despite a negative study (Grade C; BEL 3). The presence of a new sustained pulse rate of more than 120 beats/min for longer than 4 hours, tachypnea, hypoxia, or fever, should raise concern for an anastomotic leak (Grade D). A selected Gastrografin UGI study in the absence of abnormal signs or symptoms may be considered to identify any subclinical leaks before discharge of the patient from the hospital, although routine studies are not cost effective. (Grade C; BEL 3). C-reactive protein (CRP) testing should be considered if a postoperative leak is suspected.

R41(72-75)-r. Patients should have adequate padding at pressure points during bariatric surgery (Grade D). When rhabdomyolysis (RML) is suspected, creatine kinase (CK) levels should be determined, urine output monitored, and adequate hydration ensured (Grade C; BEL 3). The risk for RML increases as BMI increases (particular with BMI >55-60 kg/m^2); therefore, screening CK levels may be tested in these higher risk groups (Grade D).

How Can Optimal Follow-Up of Bariatric Surgery Be Achieved?

R42(78-83/85/88)-r. The frequency of follow-up depends on the bariatric procedure performed and the severity of co-morbidities (Grade D). Following LAGB, frequent nutritional follow-up and/or band adjustments are important for maximal weight loss (Grade C; BEL 3). Significant weight regain or failure to lose weight should prompt evaluation for (a) decreased patient adherence with lifestyle modification, (b) evaluation of medications associated with weight gain or impairment of weight loss, (c) development of maladaptive eating behaviors, (d) psychological complications, and (e) radiographic or endoscopic evaluation to assess pouch enlargement, anastomotic dilation, formation of a gastrogastric fistula among patients who underwent a RYGB, or inadequate band restriction among patients who underwent a LAGB (Grade B; BEL 2). Interventions should first include a multidisciplinary approach, including dietary change, physical activity, behavioral modification with frequent follow-up; and then if appropriate, pharmacologic therapy and/or surgical revision (Grade B; BEL 2). In those patients with or without complete resolution of their T2D, dyslipidemia, or hypertension, continued surveillance and management should be guided by current clinical practice guidelines for those conditions (Grade D). Routine metabolic and nutritional monitoring is recommended after all bariatric surgical procedures (Grade A; BEL 1).

R43(84)-r. Patients who have undergone RYGB, BPD, or BPD/DS and who present with postprandial hypoglycemic symptoms that have not responded to nutritional manipulation should undergo an evaluation to differentiate noninsulinoma pancreatogenous hypoglycemia syndrome (NIPHS) from factitious or iatrogenic causes, dumping syndrome, and insulinoma (Grade C; BEL 3). In patients with NIPHS, therapeutic strategies include dietary changes (low carbohydrate diet), octreotide, diazoxide, acarbose, calcium channel antagonists, gastric restriction, and reversal procedures, with partial or total pancreatectomy reserved for the rare recalcitrant cases (Grade C; BEL 3).

R44(86)-r. Patients should be advised to incorporate moderate aerobic physical activity to include a minimum of 150 minutes per week and goal of 300 minutes per week, including strength training 2 to 3 times per week (see the American College of Sports Medicine [ACSM] Position Statement July 2011) (Grade A; BEL 1).

R45(87)-r. All patients should be encouraged to participate in ongoing support groups after discharge from the hospital (Grade B; BEL 2).

R46(94/95/100)-r. In patients who have undergone RYGB, BPD, or BPD/DS, treatment with oral calcium citrate and vitamin D (ergocalciferol [vitamin D_2] or cholecalciferol [vitamin D_3]), is indicated to prevent or minimize secondary hyperparathyroidism without inducing frank hypercalciuria (Grade C; BEL 3). In cases of severe vitamin D malabsorption, oral doses of vitamin D_2 or D_3 may need to be as high as 50,000 units 1 to 3 times weekly to daily, and more recalcitrant cases may require concurrent oral administration of calcitriol (1,25-dihydroxyvitamin D) (Grade D). Hypophosphatemia is usually due to vitamin D deficiency, and oral phosphate supplementation should be provided for mild to moderate hypophosphatemia (1.5mg/dL to 2.5 mg/dL) (Grade D).

R47(96). In patients with RYGB, BPD, or BPD/DS, bone density measurements with use of axial (spine and hip) DXA may be indicated to monitor for osteoporosis at baseline and at about 2 years (Grade D).

R48(97/98)-r. Bisphosphonates may be considered in bariatric surgery patients with osteoporosis only after appropriate therapy for calcium and vitamin D insufficiency (Grade C; BEL 3). Evaluation should include serum parathyroid hormone (PTH), total calcium, phosphorus, 25-hydroxyvitamin D, and 24-hour urine calcium levels (Grade C; BEL 3). If therapy is indicated, then intravenously administered bisphosphonates should be used, as concerns exist about adequate oral absorption and potential anastomotic ulceration with orally administered bisphosphonates (Grade C; BEL 3). Recommended intravenous dosages of bisphosphonates include zoledronic acid, 5 mg once a year, or ibandronate, 3 mg every 3 months (Grade D). If concerns about absorption or potential anastomotic ulceration are obviated, oral bisphosphonate administration can be provided; the recommended dosages are alendronate, 70 mg/wk; risedronate, 35 mg/wk or 150 mg/mo; or ibandronate, 150 mg/mo (Grade C; BEL 3).

R49(101/102)-r. Management of oxalosis and calcium oxalate stones includes avoidance of dehydration (Grade D), a low oxalate meal plan (Grade D), oral calcium (Grade B, BEL 1, downgraded due to small evidence base), and potassium citrate therapy (Grade B, BEL 1, downgraded due to small evidence base). Probiotics containing *Oxalobacter formigenes* may be used as they have been shown to improve renal oxalate excretion and improve supersaturation levels (Grade C; BEL 3).

R50(103/107)-r. There is insufficient evidence to support routine screening for essential fatty acid, vitamin E, or vitamin K deficiencies (Grade D).

R51(104/105)-r. Routine screening for vitamin A deficiency, which may present as ocular complications, is recommended after purely

malabsorptive bariatric procedures, such as BPD or BPD/DS, and supplementation alone or in combination with other fat-soluble vitamins (D, E, and K) may be indicated in this setting. (Grade C; BEL 3).

R52(108). In the presence of an established fat-soluble vitamin deficiency with hepatopathy, coagulopathy, or osteoporosis, assessment of a vitamin K_1 level should be considered (Grade D).

R53(76/77/109-112)-r. Anemia without evidence of blood loss warrants evaluation of nutritional deficiencies, as well as age appropriate causes during the late postoperative period (Grade D). Iron status should be monitored in all bariatric surgery patients (Grade D). Treatment regimens include oral ferrous sulfate, fumarate, or gluconate to provide up to 150 mg to 200 mg of elemental iron daily (Grade A; BEL 1). Vitamin C supplementation may be added simultaneously to increase iron absorption (Grade C; BEL 3). Intravenous iron infusion (preferably with ferric gluconate or sucrose) may be needed for patients with severe intolerance to oral iron or refractory deficiency due to severe iron malabsorption (Grade D).

R54(113-116)-r. Baseline and postoperative evaluation for vitamin B_{12} deficiency is recommended in all bariatric surgery and annually in those with procedures that exclude the lower part of the stomach (e.g., LSG, RYGB) (Grade B; BEL 2). Oral supplementation with crystalline vitamin B_{12} at a dosage of 1000 µg daily or more may be used to maintain normal vitamin B_{12} levels (Grade A; BEL 1). Intranasally administered vitamin B_{12}, 500 µg weekly, may also be considered (Grade D). Parenteral (intramuscular or subcutaneous) B_{12} supplementation, 1000 µg/mo to 1000-3000 µg every 6 to 12 months, is indicated if B_{12} sufficiency cannot be maintained using oral or intranasal routes (Grade C; BEL 3).

R55(117)-r. Folic acid supplementation (400 µg/d) should be part of a routine mineral-containing multivitamin preparation (Grade B; BEL 2) and should be supplemented in all women of childbearing age to reduce the risk of fetal neural tube defects (Grade A; BEL 1).

R56(119)-r. Nutritional anemias resulting from malabsorptive bariatric surgical procedures might also involve deficiencies in vitamin B_{12}, folate, protein, copper, selenium, and zinc and should be evaluated when routine screening for iron deficiency anemia is negative (Grade C; BEL 3).

R57(120/121)-r. There is insufficient evidence to support routine selenium screening or supplementation after bariatric surgery (Grade D). However, selenium levels should be checked in patients with a malabsorptive bariatric surgical procedure who have unexplained anemia or fatigue, persistent diarrhea, cardiomyopathy, or metabolic bone disease (Grade C; BEL 3).

R58(122/123)-r. Routine screening for zinc deficiency should occur after malabsorptive bariatric surgical procedures (Grade C; BEL 3) and should be routinely supplemented following BPD/BPD-DS (Grade C; BEL 3). Zinc deficiency should be considered in patients with hair loss, pica, significant dysgeusia, or in male patients with hypogonadism or erectile dysfunction (Grade D).

R59(NEW). Copper supplementation (2 mg/d) should be included as part of routine multivitamin with mineral preparation (Grade D). Routine copper screening is not indicated following bariatric surgery but should be evaluated in patients with anemia, neutropenia, myeloneuropathy, and impaired wound healing (Grade D). In severe deficiency, treatment can be initiated with intravenous copper (2 mg/d to 4 mg/d) X 6 days (Grade D). Subsequent treatment or treatment of mild to moderate deficiency can usually be achieved with oral copper sulfate or gluconate 3 mg/d to 8 mg/d until levels normalize and symptoms resolve (Grade D). Patients being treated for zinc deficiency or using supplemental zinc for hair loss should receive 1 mg of copper for each 8 mg to 15 mg of zinc as zinc replacement can cause copper deficiency (Grade C; BEL 3).

R60(124-129)-r. Thiamine supplementation should be included as part of routine multivitamin with mineral preparation (Grade D). Routine thiamine screening is not recommended following bariatric surgery (Grade C; BEL 3). Screening for thiamine deficiency and/or empiric thiamine supplementation should be considered in postbariatric surgery patients with rapid weight loss, protracted vomiting, parenteral nutrition, excessive alcohol use, neuropathy or encephalopathy, or heart failure (Grade D). Patients with severe thiamine deficiency (suspected or established) should be treated with intravenous thiamine, 500 mg/d, for 3 to 5 days, followed by 250 mg/d for 3 to 5 days or until resolution of symptoms, and then to consider treatment with 100 mg/d, orally, usually indefinitely or until risk factors have resolved (Grade C; BEL 3). Mild deficiency can be treated with intravenous thiamine, 100 mg/d, for 7 to 14 days (Grade C; BEL 3). In recalcitrant or recurrent cases of thiamine deficiency without 1 of the above risks, the addition of antibiotics for small intestine bacterial overgrowth should be considered (Grade C; BEL 3).

R61(130)-r. Lipid levels and need for lipid-lowering medications should be periodically evaluated (Grade D). The effect of weight loss on dyslipidemia is variable and incomplete; therefore, lipid-lowering medications should not be stopped unless clearly indicated (Grade C; BEL 3).

R62(131)-r. The need for antihypertensive medications should be evaluated repeatedly (Grade D). Because the effect of weight loss on blood pressure is variable, incomplete, and at times transient, antihypertensive medications should not be stopped unless clearly indicated (Grade D).

R63(132-135/138)-r. Persistent and severe gastrointestinal symptoms (e.g., nausea, vomiting, abdominal pain, diarrhea, and constipation) warrant evaluation (Grade C; BEL 3). Upper endoscopy with small bowel biopsies and aspirates remains the "gold standard" in the evaluation of celiac

disease and bacterial overgrowth (Grade C; BEL 3). Screening with a stool specimen should be obtained if the presence of *Clostridium difficile* colitis is suspected (Grade C; BEL 3). Persistent steatorrhea after BPD/BPD-DS should prompt an evaluation for nutrient deficiencies (Grade C; BEL 3).

R64(136/137)-r. Nonsteroidal antiinflammatory drugs should be completely avoided after bariatric surgery, if possible, because they have been implicated in the development of anastomotic ulcerations/perforations. (Grade C; BEL 3) and alternative pain medication should be identified before bariatric surgery (Grade D).

R65(139-141)-r. Endoscopy may be the preferred procedure for gastrointestinal symptoms suggestive of stricture or foreign body (e.g., suture, staple) as it can be both diagnostic and therapeutic (endoscopic dilation or foreign body removal) (Grade C; BEL 3). Evaluation can also include H pylori testing as a possible contributor to persistent gastrointestinal symptoms after bariatric surgery (Grade D). Anastomotic ulcers should be treated with H_2 receptor blockers, proton pump inhibitors (PPI), sucralfate, and if H pylori is identified, triple therapy to include antibiotics, bismuth, and PPI (Grade C; BEL 3).

R66(142)-r. Patients who previously underwent a RYGB with a nonpartitioned stomach who develop a gastrogastric fistula or herniation with symptoms of weight regain, marginal ulcer, stricture or gastroesophageal reflux, may benefit from a revisional procedure (Grade C; BEL 3).

R67(143/144). Persistent vomiting, regurgitation, and UGI obstruction after LAGB should be treated with immediate removal of fluid from the adjustable band (Grade D). Persistent symptoms of gastroesophageal reflux, regurgitation, chronic cough, or recurrent aspiration pneumonia after LAGB raise concern for the band being too tight or the development of an abnormally large gastric pouch above the band or esophageal dilation. These symptoms should prompt immediate referral to a bariatric surgeon (Grade D).

R68(145/146)-r. Ultrasound should be used to evaluate patients with right upper quadrant pain for cholecystitis (Grade D). Prophylactic cholecystectomy may be considered with RYGB to prevent gallbladder complications (Grade B; BEL 2). Oral administration of ursodeoxycholic acid, at least 300 mg daily in divided doses, significantly decreases gallstone formation after RYGB and may be considered for use in patients after bariatric surgery who have not had a cholecystectomy (Grade A; BEL 1).

R69(147/148)-r. Although uncommon, suspected bacterial overgrowth in the biliopancreatic limb after BPD or BPD/DS should be treated empirically with metronidazole or rifaximin (Grade C; BEL 3). For antibiotic-resistant cases of bacterial overgrowth, probiotic therapy with *Lactobacillus plantarum* 299v and *Lactobacillus* GG may be considered (Grade D).

R70(149-152). Definitive repair of asymptomatic abdominal wall hernias can be deferred until weight loss has stabilized and nutritional status has improved, to allow for adequate healing (12 to 18 months after bariatric surgery) (Grade D). Symptomatic hernias that occur after bariatric surgery require prompt surgical evaluation (Grade C; BEL 3). Patients with sudden onset, severe cramping periumbilical pain or recurrent episodes of severe abdominal pain any time after weight loss surgery should be evaluated with an abdominal and pelvic CT scan to exclude the potentially life-threatening complication of a closed loop bowel obstruction (Grade D). Exploratory laparotomy or laparoscopy is indicated in patients who are suspected of having an internal hernia because this complication can be missed with UGI x-ray studies and CT scans (Grade C; BEL 3).

R71(153-156)-r. Body-contouring surgery may be performed after bariatric surgery to manage excess tissue that impairs hygiene, causes discomfort, and is disfiguring (Grade C; BEL 3). This surgery is best pursued after weight loss has stabilized (12 to 18 months after bariatric surgery) (Grade D).

What Are The Criteria for Hospital Admission after Bariatric Surgery?

R72(158-162)-r. Severe malnutrition should prompt hospital admission for initiation of nutritional support (Grade D). The initiation and formulation of enteral (tube feeding) or parenteral nutrition should be guided by current clinical practice guidelines (Grade D). Hospital admission is required for the management of gastrointestinal complications after bariatric surgery in clinically unstable patients (Grade D). Surgical management should be pursued for gastrointestinal complications not amenable or responsive to medical therapy (Grade D). However, if not dehydrated, most patients can undergo endoscopic stomal dilation for stricture as an outpatient procedure (Grade D).

R73(163). Revision of a bariatric surgical procedure can be recommended when serious complications related to previous bariatric surgery cannot be managed medically (Grade C; BEL 3).

R74(164). Reversal of a bariatric surgical procedure is recommended when serious complications related to previous bariatric surgery cannot be managed medically and are not amenable to surgical revision (Grade D).

Definitions:

2010 American Association of Clinical Endocrinologists Protocol for Production of Clinical Practice Guidelines–Step I: Evidence Rating*

Numerical Descriptor (Evidence Level)	Semantic Descriptor (Reference Methodology)
1	Meta-analysis of randomized controlled trials (MRCT)
1	Randomized controlled trial (RCT)
2	Meta-analysis of nonrandomized prospective or case-controlled trials (MNRCT)
2	Nonrandomized controlled trial (NRCT)
2	Prospective cohort study (PCS)
2	Retrospective case-control study (RCCS)
3	Cross-sectional study (CSS)
3	Surveillance study (registries, surveys, epidemiologic study) (SS)
3	Consecutive case series (CCS)
3	Single case reports (SCR)
4	No evidence (theory, opinion, consensus, or review) (NE)

*1 = strong evidence; 2 = intermediate evidence; 3 = weak evidence; 4 = no evidence

A 2010 American Association of Clinical Endocrinologists Protocol for Production of Clinical Practice Guidelines–Step III: Grading of Recommendations; How Different Evidence Levels can be Mapped to the Same Recommendation Grade*

Best Evidence Level	Subjective Factor Impact	Two-Thirds Consensus	Mapping	Recommendation Grade
1	None	Yes	Direct	A
2	Positive	Yes	Adjust Up	A
2	None	Yes	Direct	B
1	Negative	Yes	Adjust Down	B
3	Positive	Yes	Adjust Up	B
3	None	Yes	Direct	C
2	Negative	Yes	Adjust Down	C
4	Positive	Yes	Adjust Up	C
4	None	Yes	Direct	D
3	Negative	Yes	Adjust Down	D
1,2,3,4	N/A	No	Adjust Down	D

*Starting with the left column, best evidence levels (BEL), subjective factors, and consensus map to recommendation grades in the right column. When subjective factors have little or no impact ("none"), then the BEL is directly mapped to recommendation grades. When subjective factors have a strong impact, then recommendation grades may be adjusted up ("positive" impact) or down ("negative" impact). If a two-thirds consensus cannot be reached, then the recommendation grade is D. NA=not applicable (regardless of the presence or absence of strong subjective factors, the absence of a two-thirds consensus mandates a recommendation grade D).

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

- Obesity
- Obesity-related co-morbidities, including type 2 diabetes mellitus (T2D), hypertension, hyperlipidemia, obstructive sleep apnea (OSA), obesity-hypoventilation syndrome (OHS), Pickwickian syndrome (a combination of OSA and OHS), nonalcoholic fatty liver disease (NAFLD) or nonalcoholic steatohepatitis (NASH), pseudotumor cerebri, gastroesophageal reflux disease (GERD), asthma, venous stasis disease, severe urinary incontinence, debilitating arthritis, metabolic syndrome, or considerably impaired quality of life

Guideline Category

Counseling

Evaluation

Management

Risk Assessment

Treatment

Clinical Specialty

Cardiology

Endocrinology

Family Practice

Gastroenterology

Internal Medicine

Nutrition

Psychiatry

Pulmonary Medicine

Sleep Medicine

Surgery

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Dietitians

Nurses

Physician Assistants

Physicians

Psychologists/Non-physician Behavioral Health Clinicians

Guideline Objective(s)

- To keep pace with the evidence-based literature, and along with the accompanying checklist, assist physicians and allied health professionals with both routine and difficult clinical decision making
- To update the 2008 American Association of Clinical Endocrinologists, The Obesity Society, and American Society for Metabolic and Bariatric Surgery Medical guidelines for clinical practice for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient

Target Population

Patients who have undergone or may undergo bariatric surgery

Interventions and Practices Considered

1. Patient selection for surgery based on body mass index (BMI) and obesity-related co-morbidities
2. Selection of appropriate bariatric surgical procedures:
    - Laparoscopic adjustable gastric banding (LAGB)
    - Laparoscopic sleeve gastrectomy (LSG)
    - Laparoscopic Roux-en-Y gastric bypass (RYGB)
    - Laparoscopic biliopancreatic diversion (BPD), BPD/duodenal switch (BPD-DS)
3. Preoperative evaluation/management:
    - Comprehensive medical history, psychosocial history, physical examination and appropriate laboratory testing to assess surgical risk
    - Documentation of medical necessity for bariatric surgery
    - Informed consent
    - Providing relevant financial information
    - Preoperative weight loss
    - Preoperative glycemic control
    - Screening for primary hypothyroidism (only for those at risk)
    - Fasting lipid panel
    - Avoidance of pregnancy preoperatively and for 12 to 18 months postoperatively
    - Discontinuation of estrogen therapy before surgery
    - Non-invasive cardiac testing based on individual risk factors
    - Standardized screening for obstructive sleep apnea (OSA)
    - Smoking cessation
    - Evaluation for deep venous thrombosis (DVT) if indicated
    - Evaluation of significant gastrointestinal symptoms
    - Abdominal ultrasonography and viral hepatitis screen if indicated
    - *Helicobacter pylori* (H pylori) screening
    - Prophylactic treatment for gouty attacks
    - Psychosocial-behavioral evaluation
    - Nutritional evaluation
    - Verification of cancer screening by primary care physician
4. Early postoperative care:
    - Consultation with a dietitian and staged meal progression; multiple small meals, balanced meal plan; considering parenteral nutrition (PN) in high-risk patients
    - Treatment of micronutrient insufficiencies or deficiencies (multivitamin plus minerals calcium citrate, vitamin D, vitamin B_{12})
    - Maintaining adequate hydration
    - Monitoring blood glucose with diabetes or hypoglycemic symptoms
    - Monitored telemetry at least 24 hours if high risk for myocardial infarction
    - Pulmonary management including aggressive pulmonary toilet and incentive spirometry, oxygen supplementation to avoid hypoxemia,

and early institution of continuous positive airway pressure (CPAP)
    - DVT prophylaxis
    - Monitoring for surgical complications, including anastomotic leaks and rhabdomyolysis
5. Postoperative follow-up:
    - Frequency depending on procedure performed and the severity of co-morbidities
    - Assessment of weight loss
    - Routine metabolic and nutritional monitoring
    - Incorporation of moderate aerobic physical activity
    - Patients should be encouraged to participate in ongoing support groups
    - Oral calcium citrate and vitamin D (ergocalciferol [vitamin D_2] or cholecalciferol [vitamin D_3]) if indicated
    - Dual-energy x-ray absorptiometry (DXA) to monitor for osteoporosis and treatment with bisphosphonates if indicated
    - Management of oxalosis and calcium oxalate stones
    - Management of vitamin deficiencies and anemia
    - Assessment of lipid level and therapy with lipid-lowering medication
    - Evaluation of need for antihypertensive medication
    - Evaluation and treatment of any persistent and severe gastrointestinal symptoms
    - Avoidance of nonsteroidal antiinflammatory drugs
    - Body-contouring surgery
    - Hospital admission if indicated

Major Outcomes Considered

- Effectiveness of bariatric surgery for obesity co-morbidities, metabolic and nutritional outcomes
- Weight loss
- Morbidity and mortality related to bariatric surgery
- Complication rates
- Benefits and risks of bariatric surgery
- Costs

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Since the 2008 American Association of Clinical Endocrinologists (AACE), The Obesity Society (TOS), and American Society for Metabolic and Bariatric Surgery (ASMBS) clinical practice guideline (CPG) for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient, significant data have emerged regarding a broader range of available surgeries for the treatment of obesity. A PubMed computerized literature search (performed on December 15, 2012) using the search term "bariatric surgery" reveals a total of 14,287 publications with approximately 6,800 citations from 2008 to 2012.

Number of Source Documents

The evidence base contains 403 citations

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

2010 American Association of Clinical Endocrinologists Protocol for Production of Clinical Practice Guidelines–Step I: Evidence Rating*

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3	Consecutive case series (CCS)
3	Single case reports (SCR)
4	No evidence (theory, opinion, consensus, or review) (NE)

*1 = strong evidence; 2 = intermediate evidence; 3 = weak evidence; 4 = no evidence

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review

Description of the Methods Used to Analyze the Evidence

Recommendations are assigned evidence level (EL) ratings on the basis of the quality of supporting evidence:

2010 American Association of Clinical Endocrinologists Protocol for Production of Clinical Practice Guidelines—Step II: Evidence Analysis and Subjective Factors

Study Design	Data Analysis	Interpretation of Results
Premise correctness	Intent-to-treat	Generalizability
Allocation concealment (randomization)	Appropriate statistics	Logical
Selection bias		Incompleteness
Appropriate blinding		Validity
Using surrogate endpoints (especially in "first-in-its-class" intervention)		
Sample size (beta error)		
Null hypothesis versus Bayesian statistics		

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

The development of these updated guidelines was commissioned by the American Association of Clinical Endocrinologists (AACE), The Obesity Society (TOS), and American Society for Metabolic and Bariatric Surgery (ASMBS) Board of Directors and adheres to the AACE 2010 protocol for standardized production of clinical practice guidelines (CPG) (see the "Availability of Companion Documents" field).

The Boards of Directors for the AACE, TOS, and ASMBS approved this update of the 2008 AACE, TOS, and ASMBS Medical Guidelines for Clinical Practice for the Perioperative Nutritional, Metabolic, and Nonsurgical Support of the Bariatric Surgery Patient (2008 AACE-TOS-ASMBS CPG). These CPG expired in 2011 per the National Guideline Clearinghouse (NGC). Selection of the co-chairs, primary writers, and reviewers, as well as the logistics for creating this evidence-based CPG were conducted in strict adherence with the AACE Protocol for Standardized Production of Clinical Practice Guidelines—2010 Update (see Tables 1 to 4 in the original guideline document). This updated CPG methodology has the advantage of greater transparency, diligence, and detail for mapping the strength of evidence and expert opinion into a final graded recommendation. Nevertheless, as with all white papers, there is an element of subjectivity that must be recognized by the reader when interpreting the information.

Rating Scheme for the Strength of the Recommendations

A 2010 American Association of Clinical Endocrinologists Protocol for Production of Clinical Practice Guidelines–Step III: Grading of Recommendations; How Different Evidence Levels can be Mapped to the Same Recommendation Grade*

Best Evidence Level	Subjective Factor Impact	Two-Thirds Consensus	Mapping	Recommendation Grade
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3	Positive	Yes	Adjust Up	B
3	None	Yes	Direct	C
2	Negative	Yes	Adjust Down	C
4	Positive	Yes	Adjust Up	C
4	None	Yes	Direct	D
3	Negative	Yes	Adjust Down	D
1,2,3,4	N/A	No	Adjust Down	D

*Starting with the left column, best evidence levels (BEL), subjective factors, and consensus map to recommendation grades in the right column. When subjective factors have little or no impact ("none"), then the BEL is directly mapped to recommendation grades. When subjective factors have a strong impact, then recommendation grades may be adjusted up ("positive" impact) or down ("negative" impact). If a two-thirds consensus cannot be reached, then the recommendation grade is D. NA=not applicable (regardless of the presence or absence of strong subjective factors, the absence of a two-thirds consensus mandates a recommendation grade D).

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

The Boards of Directors for the American Association of Clinical Endocrinologists (AACE), The Obesity Society (TOS), and the American Society for Metabolic and Bariatric Surgery (ASMBS) approved this update of the 2008 AACE, TOS, and ASMBS Medical Guidelines for Clinical Practice for the Perioperative Nutritional, Metabolic, and Nonsurgical Support of the Bariatric Surgery Patient.

These Guidelines are endorsed by the European Association for the Study of Obesity (EASO), International Association for the Study of Obesity (IASO), International Society for the Perioperative Care of the Obese Patient (ISPCOP), Society American Gastrointestinal Endoscopic Surgeons (SAGES), American College of Surgeons (ACS), and International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO).

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Improved perioperative nutritional, metabolic, and nonsurgical support of bariatric surgery patients

Potential Harms

- Cirrhosis has been associated with adverse outcome following bariatric surgery, including progression to liver transplantation.
- Obstructive sleep apnea (OSA) is associated with increased risk for all-cause mortality and in bariatric surgery patients, with adverse outcomes.
- Metformin may be considered to manage hyperglycemia in the postoperative patient, but caution should be exercised in patients with reduced glomerular filtration rate (GFR) due to a potential increase for lactic acidosis.

Contraindications

Contraindications

- The psychosocial evaluation identifies potential contraindications to surgical intervention, such as substance abuse or poorly controlled psychiatric illness.
- Bulimia nervosa is rare among bariatric surgery candidates and should be considered a contraindication to these surgical procedures.
- Candidates for bariatric surgery should avoid pregnancy preoperatively and for 12 to 18 months postoperatively.
- Nonsteroidal antiinflammatory drugs should be completely avoided after bariatric surgery, if possible, because they have been implicated in the development of anastomotic ulcerations/perforations.

Qualifying Statements

Qualifying Statements

- American Association of Clinical Endocrinologists, The Obesity Society, and American Society for Metabolic and Bariatric Surgery Medical Guidelines for Clinical Practice are systematically developed statements to assist health-care professionals in medical decision making for specific clinical conditions. Most of the content herein is based on literature reviews. In areas of uncertainty, professional judgment was applied.
- These guidelines are a working document that reflects the state of the field at the time of publication. Because rapid changes in this area are expected, periodic revisions are inevitable. The guideline developers encourage medical professionals to use this information in conjunction with their best clinical judgment. The presented recommendations may not be appropriate in all situations. Any decision by practitioners to apply these guidelines must be made in light of local resources and individual patient circumstances.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Chart Documentation/Checklists/Forms

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Mechanick JI, Youdim A, Jones DB, Garvey WT, Hurley DL, McMahon MM, Heinberg LJ, Kushner R, Adams TD, Shikora S, Dixon JB, Brethauer S, American Association of Clinical Endocrinologists, Obesity Society, American Society for Metabolic & Bariatric Surgery. Clinical practice guidelines for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient--2013 update: cosponsored by American Association of Clinical Endocrinologists, the Obesity Society, and American Society for Metabolic & Bariatric Surgery. Endocr Pract. 2013 Mar-Apr;19(2):337-72. [403 references] PubMed

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2008 Jul-Aug (revised 2013 Mar-Apr)

Guideline Developer(s)

American Association of Clinical Endocrinologists - Medical Specialty Society

American Society for Metabolic and Bariatric Surgery - Professional Association

The Obesity Society - Disease Specific Society

Source(s) of Funding

American Association of Clinical Endocrinologists (AACE)

Guideline Committee

Not stated

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Financial Disclosures/Conflicts of Interest

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Guideline Endorser(s)

American College of Surgeons - Medical Specialty Society

European Association for the Study of Obesity - Professional Association

International Association for the Study of Obesity - Professional Association

International Federation for the Surgery of Obesity and Metabolic Disorders - Professional Association

International Society for the Perioperative Care of the Obese Patient - Professional Association

Society of American Gastrointestinal and Endoscopic Surgeons - Medical Specialty Society

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Mechanick JI, Kushner RF, Sugerman HJ, Gonzalez-Campoy JM, Collazo-Clavell ML, Guven S, Spitz AF, Apovian CM, Livingston EH, Brolin R, Sarwer DB, Anderson WA, Dixon J. American Association of Clinical Endocrinologists, the Obesity Society, and American Society for Metabolic and Bariatric Surgery Medical guidelines for clinical practice for the perioperative nutritional, metabolic, and nonsurgical support [trunc]. Endocr Pract. 2008 Jul-Aug;14(Suppl 1):1-83.

Guideline Availability

Electronic copies: Available in Portable Document Format (PDF) from the American Association of Clinical Endocrinologists (AACE) Web site .

Print copies: Available from the American Association of Clinical Endocrinologists (AACE), 245 Riverside Ave, Suite 200, Jacksonville, FL 32202.

Availability of Companion Documents

The following is available:

- American Association of Clinical Endocrinologists protocol for standardized production of clinical practice guidelines—2010 update. Endocr Pract. 2010 Mar-Arp;16(2):270-83. Electronic copies: Available in Portable Document Format (PDF) from the American Association of Clinical Endocrinologists (AACE) Web site .

In addition, a preoperative checklist for bariatric surgery and postoperative checklist for bariatric surgery is available in the original guideline document .

Print copies: Available from the American Association of Clinical Endocrinologists (AACE), 245 Riverside Ave, Suite 200, Jacksonville, FL 32202.

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on January 6, 2009. The information was verified by the guideline developer on January 16, 2009. This summary was updated by ECRI Institute on October 29, 2009 following the U.S. Food and Drug Administration advisory on Dexferrum. This summary was updated by ECRI Institute on July 26, 2010 following the U.S. Food and Drug Administration (FDA) advisory on Proton Pump Inhibitors (PPI). This summary was updated by ECRI Institute on July 27, 2010 following the FDA drug safety communication on Heparin. This summary was updated by ECRI Institute on December 10, 2010 following the U.S. Food and Drug Administration (FDA) advisory on Bisphosphonates. This summary was updated by ECRI Institute on October 12, 2011 following the U.S. Food and Drug Administration (FDA) advisory on Reclast (zoledronic acid). This summary was updated by ECRI Institute on March 31, 2014. The updated information was verified by the guideline developer on April 17, 2014. This summary was updated by ECRI Institute on April 15, 2016 following the U.S. Food and Drug Administration advisory on Metformin-containing Drugs.

Copyright Statement

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